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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,172	12/22/2003	Kenichi Kawase	3712174.00453	7752

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1726	

NOTIFICATION DATE	DELIVERY MODE
12/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/743,172	KAWASE ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-12 and 14-21* is/are pending in the application.

4a) Of the above claim(s) *1 and 9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,6-8,10-12 and 14-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This Office Action is responsive to the amendment filed on 10/11/2010. Claims 1-4, 6-12, 14-21 are pending. Claims 1 and 9 are withdrawn from further consideration as being drawn to a non-elected invention. Applicant's arguments have been fully considered. Claims 2-4, 6-8, 10-12, 14-21 are finally rejected for reasons stated herein below.

The 35 USC 112, 2nd rejection is withdrawn in light of Applicant's amendment.

Claims Analysis

Regarding the method of forming the active material layer onto the current collector, it has been considered but was not given patentable weight because the courts have held that the method of forming the product is not germane to the issue of patentability of the product itself. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-4, 6-8, 10-12, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jito (US 2002/0117469) and Shackle (US 5436091).

Regarding claims 2 and 10, Jito discloses a battery and an anode, comprising: an anode current collector having a projection formed on a substrate [0010]; and an anode active material layer being formed on and covering an anode current collector through sputtering [0026], and including silicon (Si) and silicon [0015].

The instant Specification pg 5, lines 13-20 states that

"The projection 11B preferably includes an element which can be alloyed with the anode active material layer 12, because the projection liB promotes alloying between the anode current collector 11 and the anode active material layer 12, thereby the adhesion properties are further improved. More specifically, the projection 11B preferably includes at least one kind of constituent or element which are easily alloyed with silicon or a silicon compound, for example, copper, nickel (Ni), iron (Fe), aluminum (A1), indium (In), cobalt (Co), manganese (Mn), zinc (Zn), silver (Ag), tin (Sn), germanium (Ge), lead (Pb) and the like."

Regarding claim 3 and 11, the anode active material layer is alloyed with the anode current collector in at least a portion of an interface with the anode current collector because the current collector is made of copper [0020].

Regarding claim 6 and 14, the projection includes an element capable of being alloyed with the anode active material layer because the projection is made of copper [0020].

Regarding claim 7 and 15, the projection includes copper [0020]

Regarding claim 8 and 16, the anode active material layer is alloyed with the projection in at least a portion of an interface with the projection because the projection is made of copper [0020].

Regarding claim 17, the electrolyte includes a body 4 and 5, a solvent and an electrolyte salt ([0033] and fig. 1).

Regarding claim 18, a package part for containing the cathode, the anode and the electrolyte therein. Considering the broadness of the term "film," it is noted that the can 4 and 5 of Jito reads on Applicant's "film". See fig. 1.

Regarding claim 19, the cathode includes a lithium-containing metal composite oxide [0031].

Regarding claims 2, 10, 20, 21, Jito discloses projections, but does not disclose the average diameter of the projection. Shackle teaches a current collector made of a microroughened surface. The microroughened surface can be prepared a number of ways. It can be made by electrodeposition of metal particles, preferably copper or nickel particles onto the electrode substrate. For example, electrodeposited foils, particularly copper and nickel foils, are preferred. It is also possible to use other processes which result in a similar degree of roughness. The dimensions include irregularities which protrude from the surface by a distance at most 10 microns, and particularly at least 0.1 micron (4:55-5:1). Such processes can create the microrough surface by removal of material from a smooth surface, e.g., by etching, by chemical reaction with a smooth surface, e.g., by galvanic deposition, or by deposition of a microrough layer of the same or a different material on a smooth surface (5:5-10).

Regarding claim 4 and 12, the irregularities can be of the same shape as those produced by electrodeposition, e.g., generally spherical nodules protruding from the surface, or they can be of a different shape (5:2-5).

Further, Shackle teaches that electrodeposited foils, particularly copper and nickel foils, are preferred for use in this invention. It is also possible to use other processes which result in a similar degree of roughness, e.g., irregularities which protrude from the surface by a distance of at least 0.03 microns, preferably at least 0.1 microns, particularly 0.1 to 100 microns, and which have at least one dimension parallel to the surface which is at most 500 microns, preferably at most 100 microns, particularly at most 10 microns, and which is preferably at least 0.03 micron, particularly at least 0.1 micron. The irregularities can be of the same shape as those produced by electrodeposition, e.g., generally spherical nodules protruding from the surface, or they can be of a different shape. Such processes can create the microrough surface by removal of material from a smooth surface, e.g., by etching, by chemical reaction with a smooth surface, e.g., by galvanic deposition, or by deposition of a microrough layer of the same or a different material on a smooth surface (emphasis added). See (4:60-5:10). Shackle recognizes that the size of the protrusion affects the adhesion of the electrode on the current collector. Shackle teaches that the protrusion size is a result effective variable. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the size of the projections of Jito, as taught by Shackle, for the benefit of improving the adhesion between the active material and the current collector. It is noted that absent specific distribution of the protrusion size, the protrusions of Shackle has been interpreted as the average protrusion size.

Response to Arguments

Applicant's arguments filed 10/11/2010 have been fully considered but they are not persuasive.

Applicant asserts that Jito teaches controlling the amount of etching of the surface-treated layer or oxide film to improve the adhesion between the current collector and thin film. See, Jito, pages 1-2, paragraph 15. Nowhere does Jito teach or suggest that its surface- treated layer or oxide film is etched to form a projection on its current collector (emphasis in original).

In response, it is noted that the etching on Jito's surface reads on Applicant's "projection."

Applicant asserts that Shackle is entirely directed to forming its microroughened surface on a cathode current collector. In fact, Shackle teaches that the irregularities which protrude from the surface by a distance of 0.1-10/um are formed on the surface exposed to the cathode composition. Nowhere does Shackle disclose or even suggest forming its microroughened surface on the anode current collector.

In response, the microroughening of the surface on a cathode current collector of Shackle is not limited to a particular cathode material. In light of Shackle's teaching, it is noted that an ordinary artisan would be motivated to roughen either the anode or the cathode, or both current collectors, for the benefit of improving the adhesion between the active material and the current collector.

Applicant asserts that one of ordinary skill in the art would have no reason to vary the size of the alleged projections of Jito to obtain an anode wherein an average diameter of the projection ranges from about 3 um to about 10 um because Jito and Shackle fail to teach that the average diameter of irregularities or projections has any particular effect on the adhesion of the anode active material layer or the performance of the battery.

In response, Shackle teaches that electrodeposited foils, particularly copper and nickel foils, are preferred for use in this invention. It is also possible to use other processes which result in a similar degree of roughness, e.g., irregularities which protrude from the surface by a distance of at least 0.03 microns, preferably at least 0.1 microns, particularly 0.1 to 100 microns, and which have at least one dimension parallel to the surface which is at most 500 microns, preferably at most 100 microns, particularly at most 10 microns, and which is preferably at least 0.03 micron, particularly at least 0.1 micron. The irregularities can be of the same shape as those produced by electrodeposition, e.g., generally spherical nodules protruding from the surface, or they

can be of a different shape. Such processes can create the microrough surface by removal of material from a smooth surface, e.g., by etching, by chemical reaction with a smooth surface, e.g., by galvanic deposition, or by deposition of a microrough layer of the same or a different material on a smooth surface (emphasis added). See (4:60-5:10). Shackle recognizes that the size of the protrusion affects the adhesion. Shackle teaches that the protrusion size is a result effective variable. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

It is noted that absent specific distribution of the protrusion size, the protrusions of Shackle has been interpreted as the average protrusion size.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795